IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s):	Harshavardhana et al.
Case:	20-1-1-1-8-1
Serial No.:	09/528,762
Filing Date:	March 17, 2000
Group:	2663
Examiner:	Nhat Q. Do

I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Signature: Linda Hurt Date: June 15, 2004

Title: Method and Apparatus for Signaling Path Restoration Information in a Mesh Network

TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith are the following documents relating to the above-identified patent application:

(1) Appeal Brief (original and two copies); and

(2) Copy of Notice of Appeal, filed on April 12, 2004, with copy of stamped return postcard indicating receipt of Notice by PTO on April 15, 2004.

There is an additional fee of $330 due in conjunction with this submission under 37 CFR §1.17(c). Please charge **Deposit Account No. 50-0762** the amount of $330, to cover this fee. In the event of non-payment or improper payment of a required fee, the Commissioner is authorized to charge or to credit **Deposit Account No. 50-0762** as required to correct the error. A duplicate copy of this letter and two copies of the Appeal Brief are enclosed.

Respectfully,

Kevin M. Mason

Date: June 15, 2004

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Patent Application

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Signature: Linda Shubert Date: June 15, 2004

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the final rejection dated February 19, 2004, of claims 1-11, 13-32, and 34-44 of the above-identified patent application.

REAL PARTY IN INTEREST

The present application is assigned to Lucent Technologies Inc., as evidenced by an assignment recorded on August 29, 2000 in the United States Patent and Trademark Office at Reel 011131, Frame 0265. The assignee, Lucent Technologies Inc., is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-11, 13-32, and 34-44 are pending in the above-identified patent application. Claims 1-5, 8-11, 16-20, and 43 remain rejected under 35 U.S.C. § 102(e) as being anticipated by Chaudhuri (United States Patent Number 6,324,162) and claims 6, 7, 13-15, 22-32, 34-42, and 44 remain rejected under 35 U.S.C. §103(a) as being unpatentable over Chaudhuri, and further in view of admitted prior art.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF INVENTION

The present invention is directed to a method and apparatus for monitoring and signaling a path restoration using pre-computed restoration paths following a detected fault on a primary service path in a communications network. (Page 11, line 1, to page 12, line 9.) A fault occurring inside the restorable portion of a network in heterogeneous or multiple network environments can be distinguished from faults occurring outside the restorable network in accordance with the ANSI Tandem Connection Maintenance standard, T1.105.05-1994. (Page 19, lines 9-20.) Path restoration is activated only when a fault causing path failure occurs inside the restorable portion of the network. Each conforming node in the restorable portion of the network has the necessary monitoring, signaling and cross-connect functionality and databases to participate actively in real time restoration. (Page 13, line 18, to page 14, line 13.) Additional non-conforming network elements can be positioned between the restoration nodes without preventing path restoration. With the signaling architecture of the present invention, when an end-node detects a path failure caused by an in-network fault, it formulates a signaling message for restoring the failed path. The restoration signaling message is thereafter relayed from one node to another in the overhead or payload of signaling paths that occupy the same bandwidth that is subsequently used by the restoration path. Once a signaling message is transmitted to an adjacent node in the overhead or payload of a particular signaling path, the node that transmitted the message makes a cross-connect that replaces the signaling path with a segment of the restoration path whose set-up was requested in the transmitted signaling message. (Page 20, line 8, to page

24, line 22.)

ISSUES PRESENTED FOR REVIEW

i. Whether claims 1-5, 8-11, 16-20, and 43 are properly rejected under 35 U.S.C. § 102(e) as being anticipated by Chaudhuri; and

ii. Whether claims 6, 7, 13-15, 22-32, 34-42, and 44 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over Chaudhuri, and further in view of admitted prior art.

GROUPING OF CLAIMS

The rejected claims stand and fall together.

ARGUMENT

Independent claims 1 and 43 were rejected under 35 U.S.C. § 102(e) as being anticipated by Chaudhuri et al. and independent claims 22 and 44 were rejected under 35 U.S.C. §103(a) as being unpatentable over Chaudhuri et al., and further in view of admitted prior art.

Regarding claim 1, the Examiner asserts that Chaudhuri discloses "signaling restoration using the restoration path segments pq, rs, and tu, which are also used as restoration path segments after signaling." Col. 12, line 54, to col. 13, line 10.

Appellants note that the network disclosed by Chaudhuri is composed of homogeneous network elements that are capable of participating in the signaling and restoration of service in the network. Chaudhuri does not disclose or suggest the restoration of services in networks that contain non-conforming network elements. Independent claims 1, 22, 43, and 44, as amended, require wherein said *signaling path transits non-conforming network elements*. The Examiner previously considered this limitation when reviewing claim 12. Regarding claim 12, the Examiner asserted that nodes 12F and 12G disclosed on page 12, lines 54-65, by Chaudhuri are considered the non-conforming elements. The specification of the present invention describes non-conforming elements as,

> for example, older generation network elements of a given manufacturer, or network elements provided by a number of manufacturers.

> The non-conforming network elements *do not provide the necessary monitoring, signaling and cross-connect functionality and databases to participate actively in real time restoration in accordance with the present invention.* However, according to a feature of the present invention, discussed further below, the restoration techniques of the present invention work even in the presence of such non-conforming network elements.

Page 14, lines 6-13.

Nodes 12F and 12G, however, participate in the signaling and restoration of service, as noted in the text cited by the Examiner, and therefore have the necessary functionality and databases. (Note that the manufacturer of the node is irrelevant in determining whether a node is conforming or non-conforming.) Thus, nodes 12 F and 12G are conforming elements, as defined in the present specification.

Conclusion

Thus, Chaudhuri does not disclose or suggest that "said at least one signaling path transits non-conforming network elements," as required by independent claims 1, 22, 43, and 44, as amended.

The rejections of the independent claims under §102 and §103 in view of Chaudhuri are therefore believed to be improper and should be withdrawn. The remaining rejected dependent claims 2-11, 13-21, 23-32, and 34-42 are believed allowable for at least the reasons identified above with respect to the independent claims.

The attention of the Examiner and the Appeal Board to this matter is appreciated.

Respectfully,

Date: June 15, 2004

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APPENDIX

1. A method for restoring a service path in a network having at least one non-conforming element, said service path having a pre-computed restoration path, said pre-computed restoration path having at least one segment, said method comprising the steps of:

detecting a restorable failure along said service path; and

signaling the restoration of said failure using at least one signaling path that occupies the same bandwidth as said pre-computed restoration path, each of said at least one signaling paths being replaced by a segment of said pre-computed restoration path after signaling is complete and wherein said at least one signaling path transits said at least one non-conforming network element.

2. The method of claim 1, wherein said network is a SONET network.

3. The method of claim 1, wherein said network is an SDH network.

4. The method of claim 1, wherein said network is an optical network having nodes capable of accessing digital overhead on said paths.

5. The method of claim 1, wherein said signaling step is initiated by an end-node along said service path.

6. The method of claim 1, further comprising the step of distinguishing a restorable failure from a non-restorable failure to determine whether to activate said restoration.

7. The method of claim 1, wherein a signaling message is transmitted in an overhead portion of said at least one signaling path.

8. The method of claim 1, wherein a signaling message is transmitted in a payload portion of said at least one signaling path.

9. The method of claim 1, wherein a signaling message identifies said service path having said failure and requests the establishment of said pre-computed restoration path.

10. The method of claim 9, wherein said signaling message is relayed from one restoration node to another node in the overhead or payload of said at least one signaling path, based on an identity of a failed service path identified in said signaling message.

11. The method of claim 10, further comprising the step of establishing a cross-connect that replaces said at least one signaling path with a segment of the pre-computed restoration path requested in the signaling message, said establishing step being performed after relaying said signaling message to a subsequent restoration node.

12. (Cancelled)

13. The method of claim 1, wherein a non-restorable failure is indicated using a flag in a path overhead field.

14. The method of claim 1, further comprising the step of determining if said failure is a restorable failure using criteria from the ANSI Tandem Connection Maintenance standard.

15. The method of claim 1, wherein said network is a restorable network within a larger multi-network environment and wherein said signaling step is initiated only when the fault causing said path failure is located within the restorable network.

16. The method of claim 1, wherein customer path terminating equipment is not part of a restorable network, and wherein said signaling step is initiated only when the fault causing said path failure is located within said restorable network.

17. The method of claim 1, wherein adjacent restoration nodes in said network initiate and terminate paths that are used for signaling in spare network bandwidth, wherein said signaling

paths remain in place for signaling until replaced by said pre-computed restoration paths used to restore service.

18. The method of claim 1, wherein end nodes are identified for said service path when said service path is initially provisioned.

19. The method of claim 18, wherein said end nodes monitor for said path failures and initiate restoration signaling only when said path failure is due to a fault located between the end nodes.

20. The method of claim 18, wherein said end nodes (i) formulate a restoration message uniquely identifying said failed service path and requesting set-up of said pre-computed restoration path, and (ii) route said message to a subsequent restoration node.

21. The method of claim 18, wherein said end nodes permit traffic to flow out of the network on a restored path only after verifying both end node-to-end node connectivity and an identity of the restored path.

22. A method for restoring a service path in a network having at least one non-conforming element, said service path having a pre-computed restoration path, said pre-computed restoration path having at least one segment, said method comprising the steps of:

detecting a failure along said service path;

determining if said failure is a restorable failure;

signaling the restoration of said restorable failure using at least one signaling path that follows said pre-computed restoration path, said pre-computed restoration path segments replacing said at least one signaling paths after signaling is complete and wherein said at least one signaling path transits said at least one non-conforming network element; and

connecting said pre-computed restoration path.

23. The method of claim 22, wherein said network is a SONET network.

24. The method of claim 22, wherein said network is an SDH network.

25. The method of claim 22, wherein said network is an optical network having nodes capable of accessing digital overhead on said paths.

26. The method of claim 22, wherein said signaling step is initiated by an end-node along said service path.

27. The method of claim 22, further comprising the step of distinguishing a restorable failure from a non-restorable failure to determine whether to activate said restoration.

28. The method of claim 22, wherein a signaling message is transmitted in an overhead portion of said at least one signaling path.

29. The method of claim 22, wherein a signaling message is transmitted in a payload portion of said at least one signaling path.

30. The method of claim 22, wherein a signaling message identifies said service path having said failure and requests the establishment of said pre-computed restoration path.

31. The method of claim 30, wherein said signaling message is relayed from one restoration node to another node in the overhead or payload of said at least one signaling path, based on an identity of a failed service path identified in said signaling message.

32. The method of claim 31, further comprising the step of establishing a cross-connect that replaces said at least one signaling path with a segment of the pre-computed restoration path requested in the signaling message, said establishing step being performed after relaying said signaling message to a subsequent restoration node.

33. (Cancelled)

34. The method of claim 22, wherein a non-restorable failure is indicated using a flag in a path overhead field.

35. The method of claim 22, further comprising the step of determining if said failure is a restorable failure using criteria from the ANSI Tandem Connection Maintenance standard.

36. The method of claim 22, wherein said network is a restorable network within a larger multi-network environment and wherein said signaling step is initiated only when the fault causing said path failure is located within the restorable network.

37. The method of claim 22, wherein customer path terminating equipment is not part of a restorable network, and wherein said signaling step is initiated only when the fault causing said path failure is located within said restorable network.

38. The method of claim 22, wherein adjacent restoration nodes in said network initiate and terminate paths that are used for signaling in spare network bandwidth, wherein said signaling paths remain in place for signaling until replaced by said pre-computed restoration paths used to restore service.

39. The method of claim 22, wherein end nodes are identified for said service path when said service path is initially provisioned.

40. The method of claim 39, wherein said end nodes monitor for said path failures and initiate restoration signaling only when said path failure is due to a fault located between the end nodes.

41. The method of claim 39, wherein said end nodes (i) formulate a restoration message uniquely identifying said failed service path and requesting set-up of said pre-computed restoration path, and (ii) route said message to a subsequent restoration node.

42. The method of claim 39, wherein said end nodes permit traffic to flow out of the network on a restored path only after verifying both end node-to-end node connectivity and an identity of the restored path.

43. A system for restoring a service path in a network having at least one non-conforming element, said service path having a pre-computed restoration path, said pre-computed restoration path having at least one segment, said system comprising:

a memory for storing computer-readable code; and

a processor operatively coupled to said memory, said processor configured to:

detect a restorable failure along said service path; and

signal the restoration of said failure using at least one signaling path that occupies the same bandwidth as said pre-computed restoration path, each of said at least one signaling paths being replaced by a segment of said pre-computed restoration path after signaling is complete and wherein said at least one signaling path transits said at least one non-conforming network element.

44. A system for restoring a service path in a network having at least one non-conforming element, said service path having a pre-computed restoration path, said pre-computed restoration path having at least one segment, said system comprising:

a memory for storing computer-readable code; and

a processor operatively coupled to said memory, said processor configured to:

detect a failure along said service path;

determine if said failure is a restorable failure;

signal the restoration of said restorable failure using at least one signaling path that follows said pre-computed restoration path, said pre-computed restoration path segments replacing said at least one signaling paths after signaling is complete and wherein said at least one signaling path transits said at least one non-conforming network element; and

connect said pre-computed restoration path.